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Review

Determinants of quality management systems implementation in hospitals

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ABSTRACT

Objective: To identify the problems and facilitating factors in the implementation of quality management system (QMS) in hospitals through a systematic review.
Method: A search strategy was performed on the Medline database for articles written in English published between 1992 and early 2006. Using the thesaurus terms 'Total Quality Management' and 'Quality Assurance Health Care', combined with the term 'hospital' and 'implement*', we identified 533 publications. The screening process was based on empirical articles describing organization-wide QMS implementation. Fourteen empirical articles fulfilled the inclusion criteria and were reviewed in this paper.
Results: An organization culture emphasizing standards and values associated with affiliation, teamwork and innovation, assumption of change and risk taking, play as the key success factor in QMS implementation. This culture needs to be supported by sufficient technical competence to apply a scientific problem-solving approach. A clear distribution of QMS function within the organizational structure is more important than establishing a formal quality structure. In addition to management leadership, physician involvement also plays an important role in implementing QMS.
Conclusions: Six supporting and limiting factors determining QMS implementation are identified in this review. These are the organization culture, design, leadership for quality, physician involvement, quality structure and technical competence.

Contents

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1. Introduction

Recently, much pressure has been exerted upon health care institutions to improve the efficiency and competitive advantages of their institutions in relation to cost effectiveness and quality of care. The reasons behind this movement are the increasing complexity of health care institutions and the system, intensity of competition in the health care market, the ongoing process of (sub-)specialization of health care providers, strengthening of the client position and increasing awareness on patient safety [1,2]. These processes have resulted in the adoption of quality management system (QMS) in hospitals, originally developed for industries.

While the quality management concept and tools have been widely accepted in hospitals, various reports on the success and failure of their implementation have been noted, varying from well-documented anecdotal evidence to empirical studies. It is generally accepted that the failure is not due to the principle of QMS itself, but it is mainly due to ineffective implementation steps or strategies [2,3]. A number of studies have been carried out to explain the factors influencing QMS implementation. These studies identified that the type of organization culture and technical skill as the factors determining the successful implementation of QMS [4–6]. However, it should be noted that limited empirical studies were conducted for healthcare setting. Hence, a systematic review in identifying the factors underlying successes and failures in QMS implementation as a base for designing a suitable implementation strategy have become major issues in health care management research. The aim of this review was to identify the determinants of QMS implementation in hospitals.

2. Methods

To identify the publications appropriate for this study, we performed a search strategy using the following thesaurus terms: 'Quality Assurance Health Care/methods, organization-and-administration, standards, trends, or 'Total Quality Management/methods, organization-and-administration, standards, trends' in mjme. A comprehensive computer-aided search of the Medline databases (1992 to early 2006) was performed using these expressions. The results were further narrowed with the keywords 'hospital' and 'implement*' and not including the terms 'guideline', 'guideline adherence', 'health planning guideline', or 'clinical pathway' or 'clinical trial'. With a limitation on English language the search resulted in 533 hits.

We specifically search for articles determining the factors influencing QMS as a total system in an organization level. The articles which are limited on describing one specific quality improvement action or project such as reducing waiting time and length of stay, improving patient feedback, were excluded. We review the title based on this criteria and excluded 427 publications. A total of 106 abstract were further independently reviewed by the first and second author to identify publications which concern the factors influencing the implementation of QMS in hospitals. This stage resulted in the exclusion of 72 publications which are limited on the description of the QMS implementation. The rest of 34 selected publications were then retrieved for the full article to evaluate its study design. We search for articles with empirical study (cross-sectional design) and review articles, thus excluding 16 single case study articles. Only 12 empirical studies and 6 review articles were included for further review. Furthermore, the reference lists of the sixth review articles were evaluated to identify relevant empirical studies which started at the year of 1993. This stage resulted in two additional empirical articles. Finally a total of 14 empirical publications were reviewed (Fig. 1).

Data were extracted by first author into a structured summary table (Table 1) explaining the method (study designs, samples and statistical analysis), outcome measurement and main finding. Since the articles were varied in their method we performed a narrative synthesis using thematic group analysis [7]. All the determinants for QMS implementation identified in the studies were evaluated based on its design and analysis method. The result was recorded in a raw table and further classified in the four key themes, i.e. organization culture, strategy and organization design, structure and technical dimension (Appendix A) derived from the QMS pyramid [8]. Two other key themes (leadership for quality and physician involvement) were added based on the main theme identified from the studies.

3. Results

The 14 selected publications varied in terms of their specific study design and objective, operational definitions, measurement of dependent and independent variables, population, setting and respondents (Table 1). Consequently, different findings and levels of evidence appeared.

Overall, there are six key influencing factors in QMS implementation identified from the review, namely organization culture, organization design, leadership for quality, physician involvement, quality structure and technical sup-

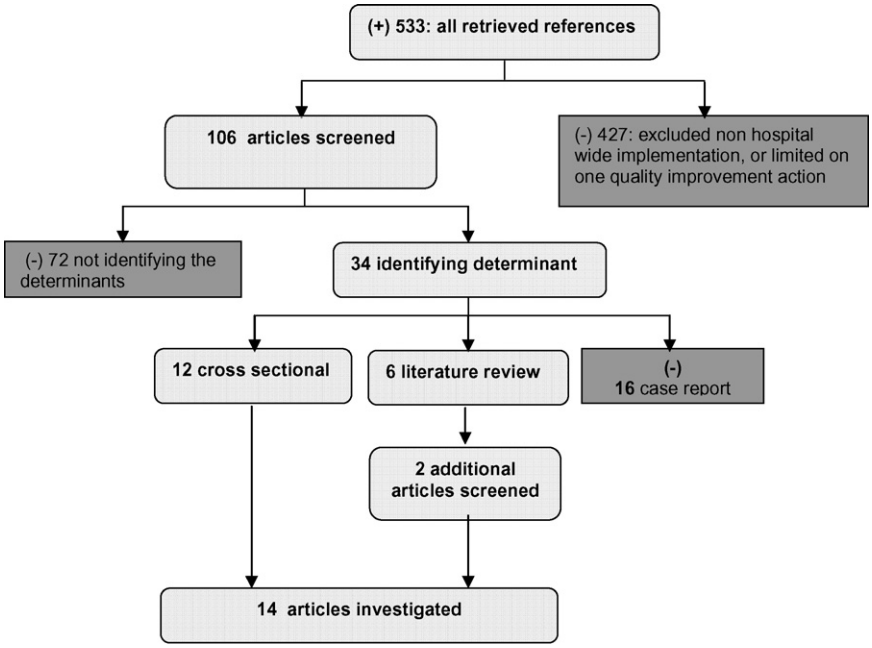

Fig. 1. Review process flowchart.

port. The following part of this article will further describe each factor.

3.1. Organization culture

Organization culture is defined as the shared belief, values, norm and behaviour of the organization that may contribute to the organization wide quality management implementation [1,3]. The role of the organization culture and organization design factor with the degree of QMS implementation, summarized in Fig. 2, has been noted in several publications [1,8–13], but only a few projects were based on empirical investigations. Four empirical studies tested the association between four organization culture types (group, developmental, rational and hierarchy) with the degree of QMS based on Malcolm Baldrige National Quality Award Criteria (MBNQAC) in different aspects and assessors [1,9,10,12]. The MBNQAC is an award criteria developed by United States Chamber of Commerce as tools for performance benchmarking. This award criteria for healthcare organization is composed of seven dimensions which are leadership, strategic planning, focus on patient, other customer and market, measurement, analysis and knowledge management, staff focus, process management and organizational performance result [1,9].

On the whole, our review identified organizational culture as one of the most important influencing factors in the implementation of QMS. Three empirical studies [9,10,12] found that group and developmental culture variables explain more than 50% of the variance. Organization having group or developmental culture associated with affiliation and teamwork and assumption of change and risk taking demonstrate a positive correlation with the degree of QMS implementation, producing precisely the opposite results compared with a hierarchical culture.

3.2. Organization design

Three empirical studies, measured the association between the organization's structure and ownership with the stage of QMS implementation or type of QMS approach [14–16]. The hospital size, associated with complexity and strategic approach was also identified as another factor related to organizational culture [9,14,15]. Other publications identified an employee empowering culture, a scientific based decision-making paradigm and customer involvement as the culture characteristics needed for QMS implementation [1,16,17].

The evidence related to hospital complexity (size, status, ownership) and structure was contradictory. Two empirical studies [9,10] identified a negative association between hospital size and organizational culture. A hierarchical structure is a hindrance to QMS success and larger hospitals seem to have such a structure. In his work about the association between type of bureaucracy, ownership and stage of QMS implementation, Badrick came up with supporting findings. He found that organizations with the professional bureaucracy type, related at the same time to a large public hospital, are less successful in QMS implementation compared with the private and machine bureaucracy type [15]. In contrast, Lee et al. [1] and Clare and Goh [14] found that small and private hospitals tend to have no QMS implementation or choose a traditional method of implementation, while a large hospital such as a public and teaching hospital has a more innovative implementation approach and achieves more success in QMS implementation.

The publications reviewed were using organization strategy typologies based on the work of Miles and

Table 1
Description of objectives, outcome variables, design and main findings

Author	Objective	Outcome variable (the level of details varied between each authors)	Design and sample method	Main findings
(1) Lin and Clousing [23]	Assessing TQM programme status and executive attitude in hospitals	TQM status: the degree of TQM involvement in hospital mission or daily activities	Design: cross-sectional	Limited implementation of TQM
			Analysis: correlation	Problems: top management involvement and commitment, employee involvement, weakness of linkage with patient satisfaction
			Pop: Northern Louisiana hospitals Method: not explained *N*: 31 hospital executives from 31 hospitals	
(2) Shortell et al. [9]	Examining the relationships between organization culture, TQM implementation and selected outcomes	MBNQAC score perceived by hospital employees and staff in departments with greatest QI initiative	Design: cross-sectional	Group developmental culture and prospector strategic approach are positively related to TQM implementation
		Perceived impact and objective measures of charges and length of stay for specific clinical conditions	Analysis: regression	QI outcomes were poorer in large and bureaucratic hospitals
			Pop.: hospitals affiliated with the Western Network's Center for Health Management Method: convenience sampling *N* = 61 of 67 hospital; 7337 respondents, 72% response rate	
(3) Carman et al. [10]	Identifying the key success factor for TQM implementation and the impact of TQM on organization performance	TQM implementation: MBNQAC score based on employee perception	Design: cross-sectional	The key success factors: strength of culture, group culture type, project dominance approach, clinical emphasize, less size and complex organization
		Hospital performance: change in patient satisfaction score	Analysis: logistic regression	The degree of TQM implementation does not affect organization performance
			Pop.: 8 health systems in USA Method: purposive sampling *N*: 10 hospitals	

(4) Weiner et al. [19]	Identifying the association between TQM/CQI adoption and the role of physician and management involvement in the board, top management leadership and board leadership	CQI/TQM adoption: binary variable indicating whether the organization was formally and behaviourally committed to TQM/CQI based on a set of components Leadership for quality: *Board leadership*: amount of board quality monitoring and quality improvement activity *Management leadership*: amount of CQI activity involving CEO	Design: cross-sectional Analysis: logistic regression Pop.: US community hospitals Method: national survey *N*: 2030 hospitals	Formal management involvement has limited effect on TQM adoption Active physician involvement and top management leadership has positive effect on TQM adoption
(5) Kennedy et al. [21]	Measuring the correlation of QI input, process and output in the emergency department	Hospital ED output indicator	Design: cross-sectional Analysis: chi-square, *t*-test Pop.: Member of ACEM** training accredited departments in Australia Method: total, response rate 63% *N* = 67 departments	There was a significant association between QM process indicator and QM input: QI physician and nurse, information system, postgraduate education. There was a significant relationship between QM process indicator and the achievement of QM-linked improvement
(6) Clare and Goh [14]	Measuring the type of TQM/CQI implementation approach in correlation with ownership and size	Type of QMS approach: TQM/CQI Business process reengineering	Design: cross-sectional Analysis: descriptive Pop.: Singapore hospitals Method: total sampling *N*: 22 hospitals (100%)	Large and public hospitals are more inclined to implement innovation-based approaches, while medium-sized and private hospitals tend to use CI as a medium for QI
(7) Huq and Martin [17]	Measuring the workforce cultural factors related to TQM implementation	Familiarity with TQM, cost of quality, employee empowerment, performance appraisal system, commitment to CQI, problem-solving approach, removing barrier, education and training	Design: cross-sectional Analysis: descriptive Pop: Nebraska hospitals Method: not explained *N* = 7 hospitals (3–4 key persons per hospital)	The development of a well-planned workforce cultural factor will support successful implementation of TQM

Table 1 (*Continued*)

Author	Objective	Outcome variable (the level of details varied between each authors)	Design and sample method	Main findings
(8) Badrick and Preston [15]	Measuring the progress of TQM implementation in relation to professional bureaucracies, ownership and complexity	Stage of TQM implementation based on Sahney and Warden	Design: cross-sectional Analysis: correlation Pop.: hospital and laboratory, Queensland, Australia Method: purposive sampling *N*: 27	Machine bureaucracies, less complex and private hospitals were more successful in TQM implementation
(9) Maguerez et al. [24]	Evaluating the feasibility of implementing CQI projects in the French healthcare organization	Goal achievement, extension of project to other topics and departments, allocation of resources, changes in attitude	Design: prospective study Analysis: descriptive Pop: CQI project submitted by departments in the French health care organization Method: jury selection *N* = 64 projects selected from 483 departments	The CQI method has been successfully implemented and adopted by other departments Management support: budget allocation, create CQI unit and training
(10) Wakefield et al. [12]	Measuring the association of organization culture on CQI implementation and its impact on medication administration error (MAE) reporting	CQI implementation: QI scales based on MBNQAC, a 58-item instrument composed of 7 dimensions perceived by nurses* MAE reporting: perception of the percentage of MAE actually reported for 11 categories	Design: cross-sectional Analysis: logistic regression Pop.: Midwest hospitals Method: convenience sampling *N* = 6 of 9 hospital; 350 respondents of 1428 nurses	Organization culture was related to CQI implementation but not to MAE reporting CQI was not positively related to MAE reporting
(11) Lee et al. [1]	Identifying the influencing factors in TQM implementation	CQI implementation: QI scales based on MBNQAC, a 43-item instrument* composed of 7 dimensions measured by CQI manager	Design: cross-sectional Analysis: regression analysis Pop.: hospitals >400 beds (108) Method: total sampling, 62% response rate *N* = 67 hospitals, 117 responses	The most important contributing factors to TQM implementation are: use of scientific skill and adoption of a quality information system

(12) Mills et al. [22]	Measuring the success of TQM program, diffusion of TQM (information and method) and its influencing factors	Successful implementation: ability to sustain at least a 20% improvement from baseline for at least 2 months before the end of collaboration Diffusion of innovation: amount of reported information acknowledged and innovation acquired in another department as stated by nurses	Design: cross-sectional Analysis: descriptive Pop.: Veteran Affair hospital participated in Quality Initiative Method: purposive sampling *N* = 22 VHA (Veteran Health Administration) represents 19 VISNs (Veteran Integrated Service Networks)	Limited reported diffusion of innovation Factors influencing: commitment from leadership, information dissemination to physicians, monitoring of progress at regional level
(13) Balding [20]	Ascertain whether the implementation of middle manager model had affected middle managers attitude to the QI programs and the changes in organization implementation level	Middle managers (MM) attitude to the QI program (role, involvement, value and commitment) Continuous quality improvement maturity based on Bessan et al (2001) Individual department QI progress (internally developed)	Design: cross-sectional Analysis: descriptive Pop.: middle manager in a specialist teaching hospitals Method: total sampling *N*: 35 middle manager (nurse and allied health professional) The MM involvement model: Senior management commitment and leadership Education and information Senior and MM QI role accountability MM involvement in QI planning MM own and operate QI program	Middle managers involvement increased the QI maturity to be more integrated in daily operation The new enablers involvement factors: senior management support and evidence of improvement The key role value: providing high standard of patient care
(14) Rad [16]	Investigate the success of TQM and barriers to its successful implementation	The mean score of TQM implementation is medium	Design: cross-sectional Analysis: correlation Pop.: Health care organization managers which implemented TQM in Isfahan province (Iran) Method: total sampling *N*: 90	Top manager's commitment increased the successful implementation Determinants TQM process related to success were: process management and focus on employee Barriers related to implementation: human resources, strategic and structural problems

The study by Lee (11) excluded 15 items from the original 58 measurement items based on a pilot test with an expert panel consisting of directors of quality improvement departments from selected hospitals, considering the relevance of items with Korean hospital circumstances and Cronbach's alpha score.

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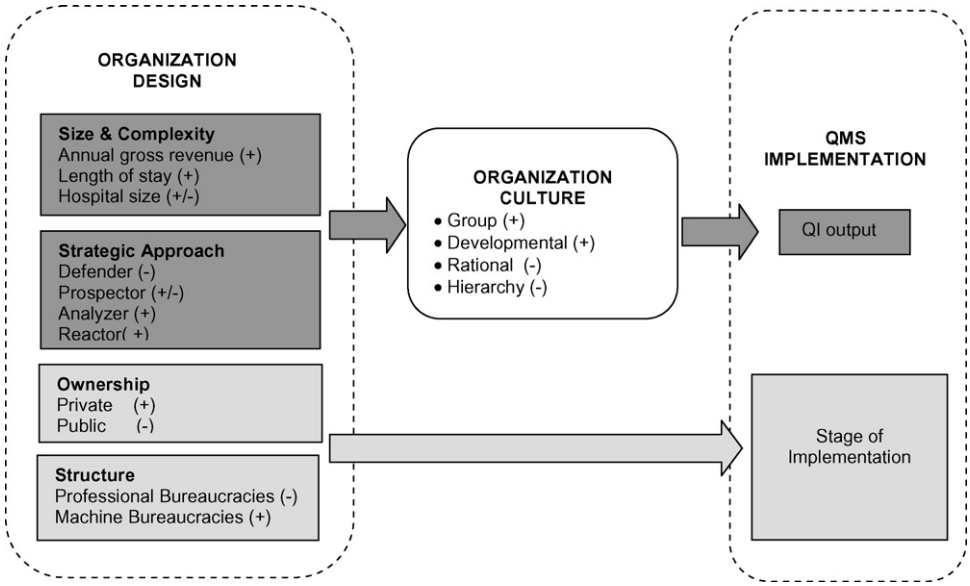

Fig. 2. The role of organization design and culture on QMS implementation.

Snow, namely defender, analyzer, prospector and reactor. Prospector organizations have high decentralization, little task specialization, few levels of management, and high interdependence among people and work units. They also focus on developing new products or services that fit fast changing customer needs, desires, and expectations. Their technical processes feature flexibility to let them quickly introduce new products. Analyzer organizations have some features of both prospector and defender organizations. They strive for efficiency in their technical processes to keep costs low and they also develop new products and services to maintain a competitive edge in changing markets [18]. Our review identified a positive association between prospector and analyzer strategic types and the degree of QMS implementation [1,9,16]. However, according to Carman et al. the prospector strategy was related to hierarchical culture, which has a negative correlation with the degree of QMS implementation [10].

3.3. Leadership for quality

Leadership is one of the enabling factors for implementing QMS. In term of quality, leadership involves efforts by senior leadership and management leading by example to integrate quality improvement into the strategic planning process and throughout the entire organization and to promote quality values and QI techniques in work practices [3]. Even though most of the leadership and quality theory refers to top management, the review findings identified various sources of quality leadership, i.e. from the top management [16,19], middle management [20] governance board or senior physicians, or from voluntary "heroic individual" physicians or senior respected nurses [19,21,22]. On the one hand, it is generally accepted that any bottom up quality action might fail without support from the hospital top management [16,19,20,23]. On the other hand, studies also noted some successful instances of implementation initiated by a committed physician without hospital management leadership support [12,21]. Mills found that leadership was not related to successful quality program initiation. Leadership support was more important in the diffusion of the initiative to other programs or departments [22].

3.4. Physician involvement

Carman et al.'s [10] and Weiner et al.'s [19] studies identified the dominant role of physicians in the hospital. Physician involvement measured as clinical emphasis and number of active physicians in governance has a significant effect on the success of QMS implementation and quality improvement [19,21,22]. Two empirical studies emphasized that a clinical improvement program as well as a clear role for physicians in the governance body would lead to a more positive effect than formal positions in hospital management or a quality improvement team and program [10,19]. In addition, the power conflict between management and physician also noted as a specific barrier for QMS implementation in hospitals [12].

3.5. Quality structure

QMS is considered as a quality management approach; a set of specific tools and methods for running the quality improvement activity and program. Therefore, the QMS implementation needs to be supported with the organization structure for quality and the technical capabilities. The structural factors included the presence of quality improvement (QI) physicians and nurses, QMS or quality assurance (QA) department supported with fulltime QMS staff and budget allocation for QMS [1,14,21,24]. Investigating the role of structural factors, Kennedy et al. [21] established a significant association between quality management process and the presence of QI physicians and nurses. This

result contradicted Lee et al.'s finding of no significant association between the presence of QMS department, QMS full staff, budget allocation and success in implementation of QMS.

3.6. Technical support

As the organization structure for quality, the organization technical capabilities was also noted as supporting factor for implementing quality management approach. This factor reflects the organization capability to use the quality management tools. The organization technical factors reviewed were education and training on the quality paradigm and method [1,17,20], scientific problem-solving approach, information system as well as system for data analysis and reporting [1,20]. Empirical investigation by Huq and Martin [17] and Lee et al. [1] established a positive relationship between technical factors and QMS implementation. The most important factors identified were hospital information system, data analysis capabilities and the employee capabilities in performing scientific problem-solving approach.

4. Discussion

4.1. Factors influencing quality management implementation

There are six important factors identified in this review: the organization culture, design, quality leadership, physician involvement, quality structure and technical competence (Fig. 3). Organization culture, mentioned as the bureaucracy type, cultural type, degree of employee empowerment [1,4,9,10], and the design factors mentioned as the strategic approach [1,9,16], the size and ownership [1,10,14,15], customer focused [24], and the paradigm in solving problems [1] are reported and identified as the critical factors in QMS implementation. The degree of QMS implementation will be higher in proportion to the degree of employee empowerment, risk-free environment and innovation emphasis [4,5,25]. These may be represented as the features of a less hierarchical culture, less bureaucracy and complex structure, more risk-taking and innovative strategic approach.

We identified inconsistent findings related to the role of hospital complexity or design factors (size, status, ownership) and structure to the degree of QMS implementation. The results might be explained by differences in (1) limitations of research method; (2) external environment at each research site; and also (3) outcome measures. First, all empirical studies were based on cross-sectional analysis; therefore the results do not imply a cause and effect relationship, but a net association. The hospital size in three studies [9,10,14] ranged from 50 to 700 beds, while the study by Lee et al. in Korea was limited to hospitals with more than 400 beds [1]. Second, three studies were conducted in the United States [9,10] and Australia [21], while the other two studies were carried out in Singapore [14] and Korea [1]. In Korea and Singapore the public hospitals receive more support, resources and technology from government as a consequence of their role as teaching hospitals. Furthermore, they also have more pressure from government regulation and public attention regarding the quality of service. This situation may be different at the other three study sites, where it is the private hospitals that obtain more support.

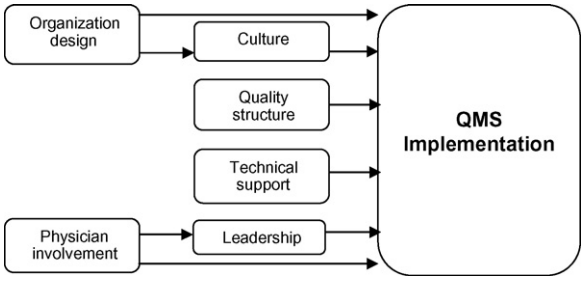

Fig. 3. Conceptual Model Of Factors Influencing TQM implementation in hospitals.

Another reason for the inconsistency is related to outcome measures. All five studies used the MBNQAC score as a measure of the degree or stage of QMS implementation at one point in time. Therefore, low scores in the earlier stage do not imply failure or success of QMS implementation, but indicate different rates or time consumed in the QMS implementation process. In conclusion, hospitals with more complex structure and greater size face more pressure for quality improvement and need more support, but at the same time they require more effort to introduce the new system due to structural complexity. While less complex hospitals face less pressure for quality improvement and need less support, they experience correspondingly fewer challenges in introducing QMS.

While top management commitment always is considered as the first requirement for implementing QMS, more findings supported the need to diffuse the quality leadership. This might be related to the fact that many health care organizations possess a more diffuse leadership structure due to the presence of an organized body of professionals who are not employees and a broader set of stakeholder accountability. Another factor was that any QMS implementation process takes several years to yield significant effects on quality improvement, while on the other hand executive turnover is unavoidable. Therefore, putting total responsibility for quality leadership on the top management will not guarantee the success of QMS implementation.

Physician involvement is considered as an important strategy for successful QMS implementation. In a healthcare organization physicians have the dominant power, and their subculture influences the organization culture and decision-making process [26,27]. In the case of quality improvement that is to be implemented organization-wide (especially in large, complex hospitals), support from hospital management and all organization subcultures, especially the physicians, is indispensable [16,23]. On the one hand, success stories of "local heroes" were found to work only in limited quality actions, and did not diffuse to other activities or departments [22,28]. On the other hand, strong management leadership without physician support only worked in the administrative and management area, but not in the clinical service area [19,29].

Our review identified that it is not always necessary to establish a formal structure for QMS, as long as all functions of QMS are clearly and appropriately distributed within the current organization structure. Besides, it is more important to educate and train all staff beyond the QMS team. Other negative effect of establishing a formal QMS department was the reliance of QMS improvement solely on this department's responsibility. Moreover, it might delay the diffusion of quality paradigm and effort throughout the organization. A clear responsibility list and job description for each member of staff and clear procedure with regard to the QMS program are critical.

In addition to the technical capabilities, referring to the extent to which employees have received relevant training in QMS tools and group decision-making processes to support quality, the hospital information systems and data analysis capabilities were identified as the critical requirements for QMS implementation. This finding concurred with the QMS cycle derived from the scientific problem-solving approach [30]. Within this approach, data and information on the input process and output of the organization service play an important role. This may explain the strong positive correlation of the information system with success in QMS implementation.

Factors influencing QMS implementation in hospitals differed compared with manufacturing organizations. Motwani identified seven critical factors in implementing QMS, i.e. top management commitment, quality measurement and benchmarking, process management, product design, employee training and empowerment, vendor quality management, customer involvement and satisfaction [31] Our review identified the following factors: organization culture (including employee empowerment), organization design and strategy, leadership for quality, physician involvement, quality structure and technical competence (measurement and information system). The differences between manufacturing and service production processes and the organization culture may contribute to this finding. The QMS approach was originally developed in the manufacturing environment, in which the culture factor and organization structure are less of a barrier. Furthermore, hospital management faces a more complex organization culture, dominated by physicians and professional power. Physician involvement is considered as the unique influencing factor in healthcare organization.

While there is an unambiguous message about the feasibility and advantages of QMS implementation, not all theoretically influencing factors have been tested empirically. In addition, the studies reviewed also varied in their measurement tools, analysis methods and populations. Drawing a general conclusion or generalizing from the results was therefore problematic. Some of the barriers and key success factors in implementing QMS were not site neutral, so each finding has to be adjusted in relation to the specific characteristics of the referred investigation.

4.2. Strategy for QMS implementation

This review aimed to identify the influencing factors in QMS implementation and to gather insights for implementation strategy. There is an unambiguous message that QMS could be well implemented in both public and private hospitals, whether large or small. Failure of QMS implementation is not due to systematic differences in the concept and hospital culture, but to inappropriate implementation. The QMS concept and method is primarily seen as a change in organization technology and philosophy—its way of doing work. In the human services, this means the way clients are processed – the service delivery methods applied to them – and ancillary organizational processes such as paperwork or procurement processes. Moreover, QMS also involves a change in organizational culture—its standards, values and belief systems about how organizations function. Finally, QMS requires a change in the organization's political system: decision-making processes and power bases. For successful QMS implementation, changes in these three dimensions must be aligned. QMS as a technological change will not be successful unless cultural and political dimensions are attended to as well [2,11,13,32].

A supporting organization culture and paradigm will facilitate the QMS implementation process. Much effort is needed to change the culture and paradigm to support continuous performance improvement based on the objective evidence paradigm. Continuous promotion, education and training, strong leadership and commitment both from management and physicians supported by employee empowerment will overcome the barriers related to the organization culture and paradigm. In addition, a quality promotion strategy prior to education and training for quality management technical skills is needed for diffusing organization awareness on quality, the new paradigm and culture. In particular, the efforts of top-level management must start quality activity; the day-to-day quality activity relies on the operational core. Hence, education and training on quality improvement should be conducted for all hospital staff.

As a management technology, implementation of QMS requires support or change in the organization infrastructure. A clear job description related to QMS activity for each employee should be embedded in the current organization structure, or support can be provided by creating a new QMS structure such as a QMS committee or department. Because the QMS paradigm should be based on data, its implementation needs to be supported by the instalment of appropriate performance measures. Two basic strategies introducing QMS are commonly used by hospitals. The first is to apply QMS in selected action or departments to improve quality, followed by dissemination to other departments or quality actions. This strategy may be chosen because it is less risky and it is likely to give examples of improvement in a short time. Providing early and internal examples will increase acceptance from other hospital parties. The other strategy involves adopting QMS in the whole organization management approach. This strategy is initiated by creating awareness and preparing the infrastructure for quality.

Like any organizations, hospitals are not free from the external environment. The pressure for quality from external parties whether government or other agencies such as insurance companies and customers, are positive initiators of change in hospitals. This review revealed different findings related to the national health system at each

study site [1,9,10,14,15]. The budget and facilities, human resource policy and market competition versus public good policy in health service provision promote different influencing factors for achievement in implementing QMS. The standardized implementation of QMS can only be done if supported by a national policy.

4.3. Further research

Despite the evidence and agreement on feasibility of QMS implementation in hospitals, there are still questions remaining. Most studies of QMS were conducted in developed countries. Since this review shows the influence of the national health system on QMS implementation, further research is needed to broaden the setting to developing countries. Some different findings in the review are related to the problem of measuring organization factors such as organization structure and strategy. Additional research on the development of organization measurement tools and strategies will enrich the quality of organization research.

Our review identifies the feasibility of QMS implementation in hospitals, the considerations and the key success factors. The next question should focus on the strategies for overcoming barriers in implementing QMS. Furthermore, the review also notes limited evidence on the impact of QMS implementation on overall hospital performance. The evidence only supports improvements in specific clinical outcomes. This is due to the time limitation on observing the impact of QMS implementation. Studies in manufacturing industries suggest at least 3 years of QMS implementation throughout the organization and a longer period to measure the overall impact on organization performance improvement [4,33,34].

Appendix A

Description of QMS determining factors investigated in the reviews:

Author	Organization culture and design	Leadership and physician involvement	Structure and Technical Support
(1) Lin and Clousing [23]	–	Management attitude toward CQI Leadership style Physician responded	–
(2) Shortell et al. [9]	Organization culture type Strategy approach Bed size	–	–
(3) Carman et al. [10]	Organization culture type Strategy approach (analyzer, prospector, beginner)	Physician involvement in management Physician involvement in TQM Clinical emphasis	–
(4) Weiner et al. [19]	–	Board leadership Top management leadership Management involvement in governance Physician involvement in governance	–
(5) Kennedy et al. [21]	–	Physician leadership QI Physician	–
(6) Clare and Goh [14]	Ownership Bed size	–	–
(7) Huq and Martin [17]	Workforce culture	–	–
(8) Badrick and Preston [15]	Structure Size/complexity Ownership	–	–
(9) Maguerez et al. [24]	–	Hospital management support	CQI unit Budget allocated Training
(10) Wakefield et al. [12]	Organization culture type (group, developmental, hierarchy, rational)	–	–

Appendix A (*Continued*)

Author	Organization culture and design	Leadership and physician involvement	Structure and Technical Support
(11) Lee et al. [1]	Organization culture type: (group developmental culture or otherwise)	–	Information system
	Strategy approach: Defender, analyzer and prospector)		CQI training
	Employee empowerment		Process and system focus Systematic problem-solving approach CQI department Full time CQI staff Budget for CQI
(12) Mills et al. [22]	–	Leadership support Active physician participation	Quality task force
(13) Balding [20]		Senior management commitment and leadership	QI education
		Middle management involvement role in planning and program,	Information and communication
(14) Rad [16]	Process management	Top management commitment and involvement	Human resources
	Focus on employee Organization strategy		QI structure

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